High Exhaust Emitters Project, Site Characterization, and Selection

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Subcontract Number

ZF-2-12252-12

Performance Period

12/94–12/96

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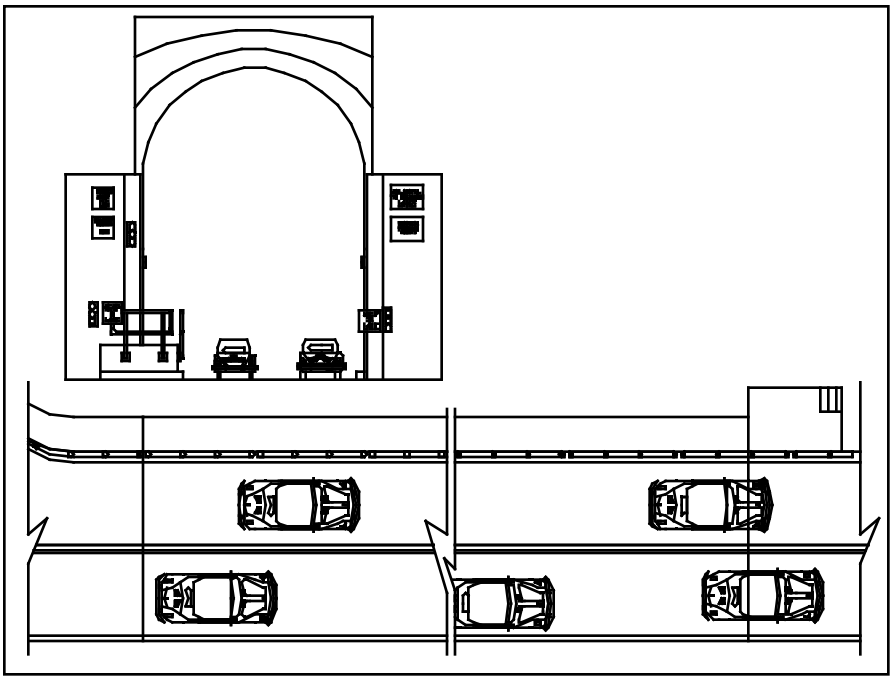
Objectives

The long term objectives of the work are to quantify the mobile source contribution of the ozone forming precursors to the urban inventory and to develop realistic, cost-effective strategies for reducing the emissions from mobile sources. Specific objectives include measuring real-world CO, speciated NMHC, NO_x, and speciated particulate emission rates from urban light-duty vehicles, comparing these results with emission factor model predictions, and laying the groundwork for a more complete experiment (i.e., one including remote sensing, road-side pullover, etc.) to accurately quantify the contribution of mobile sources to real-world emissions.



Schematic diagram of the Lincoln Tunnel

Approach

The approach involves the measurement of on-road emissions from vehicles in urban tunnels. The rationale for performing experiments in highway tunnels is based on the ability to accurately quantify emissions of CO, CO_2, NMHC, NO_x, and particulates, study different traffic patterns, separate running losses from tailpipe emissions, and compare the results with emission factor models.

There are two primary facets to this study. The first is to choose appropriate urban locations. The second is to measure on-road emission factors in six tunnels, compare these with previous experiments, and apportion the contribution of different sources to observed emissions.

Accomplishments

Five urban locations for the six experiments were located. These included the Van Nuys and Sepulveda Tunnels in LA, Boston's Callahan Tunnel, the Lincoln Tunnel between NY and NJ, and the Deck Park Tunnel in Phoenix (for winter and summer experiments).

The six experiments were conducted during the following periods:

Tunnel	Location	Sampling Dates
Deck Park Tunnel	Phoenix	January 24–26, 1995
Van Nuys Tunnel	LA	June 8–12
Deck Park Tunnel	Phoenix	July 25–27
Lincoln Tunnel	NY/NJ	August 16–18
Callahan Tunnel	Boston	September 18–19
Sepulveda Tunnel	LA	October 3–4, 1995

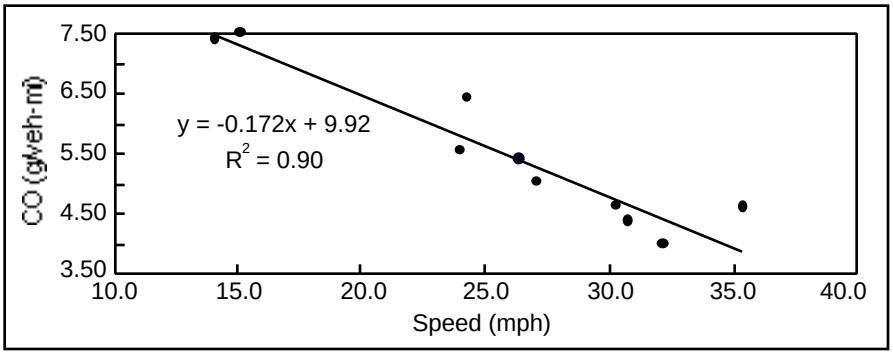
Overall, the Van Nuys fleet had higher emissions than those observed in the other experiments while the Callahan fleet had the lowest overall emissions. The urban fleet emissions measured in the 1995 experiments did not differ greatly from the interstate fleet emissions observed in the 1992 Fort McHenry and Tuscarora Mountain Tunnel experiments.

Future Direction

We are in the process of obtaining tunnel-specific vehicle model year distributions in order to predict run-specific emission factors using the California EMFAC7F and USEPA MOBILE5a emission factor models. Model predictions will then be compared with the observed emissions in the tunnel experiments.

Publications

None to date.



Effect of speed on CO emissions—Callahan Tunnel, Boston